demonstrated by the data of **Table 1**), which may not be practical to place solely in the shaft interior. Depending on the material used for the weights and the available space inside the shaft, embodiments of the invention placing the weights in the interior of the shaft may only be able to equate the ROG over subsets of the clubs.

These clubs differ from standard clubs in many ways, including

- The tempo is matched (square root relationship);
- The perceived force is matched (constant);
- The perceived length is matched (constant).

Further, the clubs are significantly longer than standard clubs (especially the woods), and contain substantial added weight. Also, this set of clubs intentionally does not include a 2-iron or 3-iron.

Other embodiments of the invention will be apparent to those skilled in the art from a consideration of the specification or practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

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1. A method of designing a customized golf club, comprising:

determining a tempo function relating tempo to club length for a particular golfer;

determining a perceived force function relating perceived force to club length and club head mass for the golfer;

selecting two design parameters from the group consisting of

target distance for the club;

club length and shaft flexibility for the club; and

preferred trajectory for a golf ball; and

using the selected design parameters, together with the determined tempo and perceived force functions, to calculate optimum values for the unselected design parameter and the club head mass for the customized golf club.

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2. The method of claim 1, wherein tempo is measured by speed of the golfer's hands at impact.

3. The method of claim 1, wherein perceived force is measured by centripetal force applied along the shaft at impact.

4. The method of claim 3, further comprising measuring an effective arm length of the golfer in order to determine the centripetal force.

5. The method of claim 4, wherein the effective arm length is selected from the group consisting of arm length, distance from hands to sternum in address position, and distance from hands to collarbone in address position.

6. The method of claim 1, wherein trajectory is controlled by varying club head loft.

7. The method of claim 6, wherein the club head loft is the design loft.

8. The method of claim 6, wherein the club head loft is the effective loft.

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9. The method of claim 1, further comprising optimizing the lean angle of the clubs.

10. The method of claim 1, wherein the tempo is independent of club length.

11. The method of claim 1, wherein the tempo is a linear function of club length or of club length plus arm length.

12. The method of claim 1, wherein the tempo is a power-law function of club length or of club length plus arm length.

13. The method of claim 1, wherein the perceived force is independent of club length.

14. The method of claim 1, wherein the perceived force is a linear function of club length or of club length plus arm length.

15. The method of claim 1, wherein the perceived force is a power-law function of club length or of club length plus arm length.

16. The method of claim 1, wherein the perceived force is independent of club length and the tempo is proportional to the square root of club length plus arm length.

17. The method of claim 1, further comprising designing a second golf club having at least one different design parameter from the first club, wherein the same tempo function and perceived force function apply to both clubs.

18. The method of claim 17, wherein the two golf clubs have a reduced difference in perceived length.

19. The method of claim 18, wherein the perceived length is measured by determining the radius of gyration of a club about a selected center point.

20. The method of claim 19, wherein the center point is selected by
having the golfer swing a test club to determine its perceived length;
having the golfer swing a comparison club one or more times while adding weight to the comparison club at a selected point along the shaft until the golfer is unable to distinguish the perceived lengths of the test club and the comparison club; and
determining the center point around which the test club and the weighted comparison club have identical radii of gyration.

21. The method of claim 1, comprising designing up to thirteen golf clubs all having the same tempo and perceived force functions and reduced differences in perceived lengths.

22. The method of claim 1, further comprising constructing the designed club using a CAD/CAM system.

23. A method of determining a perceived center of gyration for a golfer, comprising
having the golfer swing a test club to determine its perceived length;
having the golfer swing a comparison club one or more times while adding weight to the comparison club at a selected point along the shaft until the golfer is unable to distinguish the perceived lengths of the test club and the comparison club; and
determining the center point around which the test club and the weighted comparison club have identical radii of gyration.

24. A method of constructing a matched set of golf clubs for a golfer, comprising

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determining a perceived center of gyration according to the method of claim 23; and

constructing a plurality of clubs having reduced variation in radius of gyration with respect to the determined center point.

25. A matched set of golf clubs for a golfer, comprising

a plurality of golf clubs, wherein each club has a length and a target distance, wherein a selected functional relationship exists over the plurality of clubs between

the tempo when striking a ball with one of the clubs to produce the target distance for that club, and

the length of that club.

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26. The matched set of golf clubs of claim 25, wherein the tempo when striking a ball with each of the clubs to produce that club's target distance is the same.

27. The matched set of golf clubs of claim 25, wherein the selected functional relationship is a linear relationship.

28. The matched set of golf clubs of claim 25, wherein the selected functional relationship is a polynomial relationship.

29. The matched set of golf clubs of claim 25, wherein the selected functional relationship is a power-law relationship.

30. The matched set of golf clubs of claim 25, wherein a selected functional relationship exists over the plurality of clubs between

the perceived force when striking a ball with one of the clubs to produce the target distance for that club, and

the length of that club.

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31. The matched set of golf clubs of claim 30, wherein the perceived force is measured by determining the centripetal force exerted along the shaft of the club at impact.

32. The matched set of golf clubs of claim 25, wherein the tempo is measured by determining the speed of the golfer's hands at impact.

33. The matched set of golf clubs of claim 25, wherein the lean angle of the clubs is optimized.

34. The matched set of golf clubs of claim 25, wherein the clubs have been designed by a computer-aided design method, and wherein the club have been manufactured by a computer-assisted manufacturing method.

35. A matched set of golf clubs for a golfer, comprising
a plurality of golf clubs, wherein each club has a length and a target distance,
wherein a selected functional relationship exists over the plurality of clubs
between
the perceived force when striking a ball with one of the clubs to produce
the target distance for that club, and
the length of that club.

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36. A matched set of golf clubs for a golfer, comprising
a plurality of golf clubs, wherein each club has a length and a desired ball
trajectory,
wherein a selected functional relationship exists over the plurality of clubs
between
the tempo when striking a ball with one of the clubs to produce the desired
ball trajectory for that club, and

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the length of that club.

37. The matched set of golf clubs of claim 36, wherein the tempo when striking a ball with each of the clubs to produce that club's desired ball trajectory is the same.

38. The matched set of golf clubs of claim 36, wherein the selected functional relationship is a linear relationship.

39. The matched set of golf clubs of claim 36, wherein the selected functional relationship is a polynomial relationship.

40. The matched set of golf clubs of claim 36, wherein the selected functional relationship is a power-law relationship.

41. The matched set of golf clubs of claim 36, wherein a selected functional relationship exists over the plurality of clubs between

the perceived force when striking a ball with one of the clubs to produce the desired ball trajectory for that club, and

the length of that club.

42. The matched set of golf clubs of claim 41, wherein the perceived force is measured by determining the centripetal force applied along the shaft of the club at impact.

43. The matched set of golf clubs of claim 36, wherein the tempo is measured by determining the speed of the golfer's hands at impact.

44. The matched set of golf clubs of claim 36, wherein the lean angle of the clubs is optimized.

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45. A matched set of golf clubs for a golfer, comprising

a plurality of golf clubs, wherein each club has a length and a desired ball trajectory,

wherein a selected functional relationship exists over the plurality of clubs between

the perceived force when striking a ball with one of the clubs to produce the desired ball trajectory for that club, and

the length of that club.

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